

Exercise Sheet 3: Practice Problems, Control Statements

1. Write a program to calculate the area of a rectangle. Take height and width as user input and print the result.
2. Write a program to calculate the area of a circle. Take radius as user input print the result.
3. Write a program to calculate the area of a triangle. Take the base and height as user input and print the result.
4. Write a program to calculate the volume of a box, given the height, width and depth as input. Print the result.
5. Given two positive integers a and b , calculate the square of the hypotenuse of the right triangle whose base and height are a and b respectively.
6. Given a, b, c as input, find and roots of the quadratic equation $ax^2 + bx + c = 0$ using the formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. Print both roots in the same line formatted like " $x_1 = 1.5, x_2 = 2$ ".
7. Write a program that will take your Name as input and prints "Hello Name".
8. Write a program to generate 4 random numbers and print them in one line separated by commas.
9. Write a program to print the value of pi up to 12 digits after decimal place. (Hint: import math).
10. You've just had lunch at a new restaurant, and received this bill:
price of the platter = 450 Tk
vat: = 15%
service charge = 10.25% on total, i.e. on (price + vat)
Write a program to calculate how much you have to pay.
11. Given a sequence, count the frequency of 'A', 'T', 'C', 'G' or 'U'.
12. Write a program to calculate the GC content of a given sequence.
13. Given a DNA sequence, do mutation in some random position and print the new sequence.
14. Take an integer as input and if it is positive, print "Positive", "Zero" if it is 0, otherwise print "Negative".
15. Take input an integer and if it is even then print "Even" otherwise print "Odd".
16. Take input a student's marks and output the corresponding letter grade, where marks ≥ 90 is 'A', marks ≥ 80 is 'B', marks ≥ 70 is 'C', marks ≥ 60 is 'D', marks ≥ 50 is 'E' and 'F' otherwise.
17. Take the age ($0 \leq \text{age} \leq 120$) and gender ('M'/'F') of a person as input, and output his/her age group. For males print "He is a <age group>" and for females print "She is a <age group>". The age groups are given below:

0-10: Child	11-17: Teenager	18-25: Young adult
26-35: Adult	36-55: Middle aged	56-120: Senior
18. Write a program that will take a letter as input and print the corresponding color, i.e. if the input is 'b' or 'B' then the output should be 'Blue'.
19. Write a program that will take a letter as input and print "Adenine" for 'A' or 'a', "Cytosine" for 'C' or 'c', "Guanine" for 'G' or 'g', "Thymine" for 'T' or 't', "Uracil" for 'U' or 'u' and "Unknown" for all other inputs.
20. You want to apply some age restriction in your movie streaming site. So you have to take the user's age as input and generate the output message like below:

0-12: "Can only watch PG rated movies"
13-17: "Can watch PG-13 rated movies"
18-above: "Can Watch R rated movies"

Write a program for that.
21. Write a program to check whether a year is a leap year or not. For this, you need to check the following 3 conditions:
 - a. Any year that is divisible by 400 is definitely a leap year.
 - b. If it is not divisible by 400, then check if it is divisible by 100, if so, then it is NOT a leap year (even if it is divisible by 4), and
 - c. If the above two conditions are not satisfied we check for divisibility by 4, if it is divisible by 4 it is a leap year.For example, if year = 2400, it is leap year, (Condition i satisfied)
but if year = 2200, is NOT a leap year, (Cond. ii satisfied),
and if year = 2020, is a leap year, (Cond. iii satisfied).